

MEMORANDUM

To: Mary Scurlock, Oregon Stream Protection Coalition
From: Chris Mendoza, Mendoza Environmental LLC, Olympia, WA.
Subject: General comments on Oregon Compliance Monitoring Survey results
Date: 20 December 2018

My name is Christopher Mendoza and I have been a participant in the Washington Department of Natural Resources (WDNR) forest practices compliance monitoring program for the past eight years. I represent several NGOs in Washington's environmental community (Washington Environmental Council, Washington Forest Law Center, Conservation Northwest, Wild Fish Conservancy, Olympic Forest Conservation Organization). I also serve on WDNR Cooperative Monitoring Evaluation and Research (CMER) committee that oversees the development and implementation of studies designed to test the effects of forest practice rules on aquatic resource including fish habitat (e.g. riparian and stream conditions, water quality, steep unstable slopes, roads, etc.). WDNR's compliance monitoring program also has an advisory committee comprised of stakeholders including WA state forest practices regulatory agencies (Washington Departments of Ecology, WA department of Fish and Wildlife), Local Tribes, Timber companies, "small" family forestland owners, and Federal regulatory agencies (US Fish and Wildlife Service). All meetings are public and follow open public meeting laws in accordance with Washington State.

Scope of this review: You have asked me to comment on the concerns you raised with the Oregon Board of Forestry in September, 2018 when the most recent ODF Compliance Audit was presented to the Board. In my opinion, you have correctly identified the key issues, although there are additional problems revealed by the appendices on methods which are discussed below.

1. Forest Landowner Volunteer Compliance Monitoring is Bias by Default

Any credible forest practices compliance monitoring program must be administered by an agency that has the authority to access ANY and ALL forest landowner's property with adequate notice (in WA that's one week's notice) to guard against biased results from a selective, nonrandom sample. As you correctly point out, randomly selecting harvest units / sites to sample for compliance is

fully negated by the fact that a significant number of samples are dropped from the sample population at the landowner's discretion. Using landowner permission as an up-front screen for site selection automatically selects for landowners that are at the very least confident they are rule compliant, while deselecting landowners who knowingly are not complying with ODF rule(s). This is analogous to the IRS (Internal Revenue Service) only conducting audits on taxpayers who volunteer to be audited – what % of the U.S. population (person and corporations) would choose to be audited if given a choice, and how would that selection process bias tax audit results? Without State agency authority to access and audit forest practices on unbiased, randomly selected harvest units at the agency's discretion, ODF's Compliance Audit results are biased in the direction of full compliance while grossly underrepresenting non-compliance. The Compliance Audit report admits this to some extent in stating that:

“Analysis focused on implementation of Forest Practices Act rules and potential or actual impacts to resources. Without a full enforcement investigation and legal decision on compliance, the agency considers outcomes as apparent rates of compliance or non-compliance, although for readability the word “apparent” is not used but implied.”

Moreover, PNI (private non-industrial) landowners may not know the difference between a “full enforcement investigation and legal decisions on compliance” and being audited when it comes to volunteering. Both non-responses and those contacted but unwilling to volunteer for the audit would also contribute to biased results. Would you volunteer knowing the state carries legal enforcement authority for gross violations?

In Washington state (WAC 222-08-160(4)), the Compliance Monitoring Program must answer whether forest practices are being conducted in compliance with the rules and to provide **statistically sound biennial audits** and reports to the Forest Practices Board. Further, “Sample size estimation is based on attaining a margin of error of +/- 5% for the statewide compliance proportion for riparian and road activities.” See

https://www.dnr.wa.gov/publications/fp_cm_program_design.pdf?zi4n8

In order to guard against landowner biased results, the WA protocol for Compliance Monitoring directs: “Give the landowner a notification call with the dates that you will be reviewing their application,” and “The landowner may

attend the assessment; and they can clarify elements of the FPA. However, they cannot be part of the decision-making process for determining the compliance of their activities.”

https://www.dnr.wa.gov/publications/fp_cm_program_protocols.pdf?uqguvv

2. Statistical Reporting Methods for Aggregating Artificially Inflate Results

Tables 3, 4 and 5 depict artificially inflated compliance rates resulting from methods that are fatally flawed by dividing the total number of non-compliance validated “on the ground” by the total number (thousands in many cases) of *potential* rule applications that were *never* visited, then using that result as % compliance (Table 3 “overall compliance” row one “625 / 25,600 = 98%”). This is analogous to state law enforcement officers detecting 200 out of 1000 motorist speeding on a major interstate (e.g. over 60 mph) and then dividing the 200 that were noncompliant by the 100,000 motorists that used the same interstate, but were never checked for speed (200/100,000 = 100% compliance), instead of by the 1000 they did check for speed (200 / 1000 = 80% compliance, 20% non-compliance). The Report goes on using the same flawed method when breaking down overall compliance rates by administrative area (Table 3), landowner class (Table 4), and Rule division (Table 5) all of which are statistically inaccurate and misleading. Only after a sample size has been determined adequate for each forest practices rule, (by a qualified statistician) can one infer the results to the general population being sampled, and never by dividing the number of sites actually checked for compliance on the ground by the total number of the potential applications for that rule (see above).

If ODF’s goal is to report statistically robust results on compliance rates for forest practices rules, or other sub-categories (e.g. harvest units), they must first and foremost determine adequate field sample size(s) required to infer to the general population not field sampled, as opposed to ODF’s flawed method of dividing the field-sampled population by the total number of FPA’s that were not field sampled (e.g. using 1000 - 5000 FPAs as numerator). The ODF report gives a couple of examples of how this approach should work, though the sample size is too small to statistically infer to the larger population, by simply reporting the total number of sites that were actually field-checked for compliance monitoring. In reporting on culvert sizing to the 50-year flow, On page 15 ODF reports:

A notable finding with Division 625 rules centers around culvert sizing and 50-year peak flows. The official ODF guidance states that culvert sizing should be performed using the methods expressed in Forest Practices Technical Note Number 5 (Tech Note 5, 2002). Size is based upon the contributing drainage area to the stream crossing mi^2 , and mapped 50-year peak flow at the location of the stream crossing (cfs/mi^2). Sixty-two percent of culverts were adequately sized to pass the 50-year peak flow (OAR 629-625-0320(2(a))).

And on page 17 ODF reports:

Compliance with culvert sizing requirements (OAR 629-625-0320(2(a))) has varied over the four years of study. The calculated compliance rate in 2017 was 62%. For comparison, this rate was less than 90% in 2013 (85%) and 2016 (73%), but compliance was 96% in 2014. This variability may be affected by sample size. In 2017, thirteen stream culverts were assessed for the ability to pass the 50-year flow.

The above examples report culvert sizing more accurately for compliance rates, for that specific rule requirement, by only using culverts that were actually field-checked for compliance. In this case only 62% of culverts that were actually checked “were adequately sized to pass the 50-year peak flow.” Note that ODF in this case -- and only in this case -- did not then divide the total number of culverts field-checked by the total number of culverts on forestlands applied to all FPAs (e.g. using 1,000 culverts as numerator would yield a compliance rate of 99%). Doing so would have artificially inflated the culvert sizing compliance rate, much like ODF has done for reporting compliance rates for other rules and harvest unit level compliance (See ODF report, Tables 3, 4, and 5).

Another example would be to convert ODFs until level compliance for sediment delivery to streams by only using the number of harvest units that were actually sampled. The ODF report states (page 17):

Sediment delivery to Waters of the State was unevenly distributed between harvest operations. Thirty-six units delivered sediment. The remaining 35 units that contained Waters of the State did not deliver sediment to those waters, and 29 units had no Waters of the State.

This equates to a compliance rate of 49% (36/71) when excluding the 29 units that should be screened out because they contain no Waters of the State.

However, ODF lists compliance for Harvest units at “99%” because once again the field-sampled units were inappropriately divided by the total number of harvest units, including those that were not field checked. Table 3 listing compliance by **rule division** exemplifies how compliance rates become artificially inflated by placing the **number of rule applications** that were never field checked for compliance in the denominator (thousands in some cases) with **Noncompliance** in the numerator (1-384):

Table 5. Compliance by rule division.

Rule Division	Description	Number of Rule Applications		
		Noncompliance	Total	Compliance Rate
625	Road Construction and Maintenance	176	11,384	98%
630	Harvesting	384	10,582	96%
640	Vegetation Retention Along Streams	24	535	96%
645	Protection for Significant Wetlands	1	17	94%
655	Protection for “Other Wetlands”	12	111	89%
660	Operations Near Waters of the State	18	2,940	99%

If ODF intended to choose a method that selectively depicts the highest possible compliance rates for forest practices rules, culvert condition, road condition, harvest unit, etc., then ODF’s reporting “methods” hits that mark. However, a more credible forest practice compliance monitoring program would consult with qualified statisticians to determine adequate sample size(s), set confidence intervals (e.g. 95%) for specific rules being tested, and other related categories (e.g. harvest unit, rule division), before attempting to infer the results to the larger landscape. And under no conditions of which I am aware has a statistician ever recommended dividing the actual field-sampled population by the total number of rule applications that were never visited for reasons stated above.

3. Additional shortcomings of ODF Compliance Monitoring Report

Sediment delivery cannot reliably be estimated from visual observations. ODF reports visual observation of estimates of sediment volumes without using measurable criteria. While visual observations may be adequate to detect whether direct delivery of sediment-laden, turbid water is directly delivering to streams (e.g. muddy road ditch line water being conveyed via cross drains / culverts into streams), it is not an accurate method for estimating sediment volume. Methods exist that actually capture and measure water and sediment coming out of culverts, but visual observation is not one of them.

Attempting to estimate direct impacts to aquatic resources in the absence of a robust research and monitoring program that tests the effects of forest practices on fish and fish habitat is not reliable. While ODF does not claim to be conducting effectiveness monitoring when it makes judgment calls during compliance monitoring about resource impacts, the line between these two types of monitoring seems extremely blurred.

Cause and effect relationships between forest practices and streams and their biota are normally tested through experimental design and implementation. (Groom et al. 2011). The prior example of visually estimating sediment conveyed through culverts directly into streams may be a good example of non-compliance with a road related rule, but the amount of sediment and effect that sediment has on fish and their habitat cannot be accurately assessed without further study. Moreover, unless the visual estimator happens to be present during a long-duration storm event, combined with logging truck haul traffic, they will likely under-detect and underestimate the amount of sediment being conveyed to streams.

Recommendations for Improvement to Compliance Monitoring Reporting

1. Utilize Third Party Review. The program would greatly benefit from having an independent scientific peer review of the framework, approach, and sampling methods currently being used by ODF. This would include a qualified statistician that could make recommendations on sample size(s) for those rules being tested. Washington State Department of Natural Resources recently had their compliance monitoring program go through

independent scientific peer review at the University of Washington and has since revised their program.

2. Increase ongoing oversight. Form a compliance monitoring program advisory committee comprised of experts representing stakeholders (landowners, state and federal regulatory agencies, tribal organization, environmental organizations, etc.) would help ensure that ODF results are widely supported and accepted. This would include holding regular public meetings updating the public on the current status, priorities and direction the ODF compliance program is pursuing with an expected timeline for results.
3. Separate compliance from effectiveness monitoring. ODF should develop and implement a discrete research and monitoring program to test the effects of forest practices on aquatic resources including water quality. Since ODF recently adopted new riparian buffer rules, and has road rules in place, testing the direct effects those rules have on fish habitat and stream conditions (e.g. shade, stream temperature, sediment, wood loading) would more accurately estimate resource impacts.

References

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Hawksworth J., P. Clements and J. Laine. 2017. Forest practices compliance audit: 2017 annual report. Oregon Department of Forestry.

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